

# SINGULARITY FORMATION FOR THE KELLER-SEGEL SYSTEM IN THE PLANE

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The classical model for chemotaxis is the planar Keller-Segel system

$$u_t = \Delta u - \nabla \cdot (u \nabla v), \quad v(\cdot, t) = \frac{1}{2\pi} \log \frac{1}{|\cdot|} * u(\cdot, t)$$

in  $\mathbb{R}^2 \times (0, \infty)$ . Blow-up of finite mass solutions is expected to take place by aggregation, which is a concentration of bubbling type, common to many geometric flows. We build with precise profiles solutions in the critical-mass case  $8\pi$ , in which blow-up in infinite time takes place. We establish stability of the phenomenon detected under arbitrary mass-preserving small perturbations and present new constructions in the finite time blow-up scenario.

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